THE DANGER OF INTRODUCING INSECT PESTS.

The study of the Insect Pests attacking crops in India has shown that whilst many are probably indigenous to India or countries adjacent to India, a few at least have in all probability been introduced from foreign countries more or less remote. This danger is always present and many countries have found it necessary to adopt stringent regulations to exclude Insect Pests which are liable to be carried from one country to another in a living state. The geographical position of India, its diversity of climate, soils, vegetation and crops, renders this danger less than it is elsewhere and it is fortunate that so few of the virulent pests of other countries have obtained a foothold here.

2. But with increased communication and trade with other countries and the increasing speed with which merchandise is transported, this danger has now become formidable and it is reasonable to suppose that in the absence of all precautions, very virulent Insect Pests may be introduced which, if allowed to propogate unchecked, might work great damage among the staple crops and cause great losses to the country. This is experience of other countries, notably of the United States where the outbreaks causing losses estimated to amount to millions of dollars have been traced to importations from Europe.

3. Insects in their natural habitat, are checked by natural enemies, without which their increase would be enormous. These insects when introduced to fresh places, have perhaps no enemies, and their increase then proceeds, unchecked, sometimes so rapidly as to make the insect in its new home, a dangerous pest. Sooner or later, in their new habitat new enemies attack them and play the part of the enemies in their original habitat, but this may not take place for a long period during which their destructiveness may be very serious.

4. Many insects have been carried in ships and have now become cosmopolitan. These include the common cockroaches, the beetles and moths that attack grain, flour, stored provisions, etc., and the common household pests which are inevitably spread by commerce. Against these no practical measures can be taken, the bulk of the merchandise in which they come being so large. The danger that can be guarded against lies especially in the plants, seeds, tubers, bulbs, etc., which are imported for planting. As insects on such things are placed in the best possible conditions for thriving and are introduced directly to the growing plants on which they live the interests of agriculture generally are directly involved. Cotton seed from the United States is extremely likely to carry the cotton boll weevil, perhaps the most formidable pest of cotton in the world at the present time. The United States Department of Agriculture are spending large sums in checking this pest and its yearly ravages are said to cause damage estimated at millions of dollars. Similarly sugar-cane imported for planting is likely to carry borers, or caterpillars which work so much havoc wherever sugar-cane is grown. There are some of these borers in India at present, but the West Indian, the Australian, the Javan, the Mauritian species are not known in India and it is necessary to take precautions against their introduction.

5. The following are the chief imports in which insect pests are likely to be found and the best methods available for treating them are given in each case.

6. *Living Plants.*—Many insects are carried on living plants or in the soil or packing in which they come. These should be carefully unpacked, not out of doors, but in a room or a verandah, where the presence of insects can be easily detected. If the plants are healthy, they may be planted out, preferably in secluded corners in quarantine, so that diseases developing may not pass to neighbouring plants. It is advisable to dip all such plants in one of the mixtures given below.

7. If the plants have scale on them, mealy bug, blight or other unhealthy appearances, they should be dipped in the mixture (A) and then planted in quarantine; if the disease grows beyond control, the plants should be burnt. If the disease lessons they should be treated with the mixture A by spraying or sprinkling them till the disease disappears and the plants are healthy.

8. The package and the packing material should be burnt. If insects of any kind are found on opening the package, the whole inclusive of the plants should be put on the fire: the insects may be harmless or not, but it is impossible to be certain in any particular case.

9. *Roots, Tubers, Bulbs.*—These should be treated much as the living plants, but as they are more likely to harbour beetles, borers, etc., a few should be broken or cut open to see that they are sound. They should, in all cases, be dipped in mixture A or B, and in the case of tubers such as potatoes this should be made of double strength.

10. *Canes.*—Sugar-canes should be carefully inspected: canes in which holes of boring insects are found, should be burnt; those on the outside of which scale, mealy bug or any appearance of blight is discovered, should be dipped in mixture A or B of double strength, and the dipping repeated daily till they are planted.

11. *Seeds.*—Seeds should be fumigated with benzene or carbon bisulphide. They should never be planted till that has been done in the following manner:—

Place the seeds in an air-tight box, with a big wad of cotton and pour benzene or carbon bisulphide on the wad; the latter is preferable and should be used at the rate of one ounce per fifteen cubic feet, or one drachm (teaspoonful) per cubic foot. Benzene is used at the rate of 1½ drachms per cubic foot. The box should be kept closed for twenty-four hours, and should not be approached with a naked light.

12. The radical and scientific method of treating all plant imports is by fumigation with hydrocyanic acid. This is the measure practised in Ceylon, the Cape, the United States, Germany and many other countries. Botanic Gardens, Nurseries, or other establishments that import large number of living plants should fumigate everything that comes in from abroad. The method is simple and easy; and complete information can be obtained from the Entomologist.

13. Other importers of living plants and other articles likely to harbour pests, who may not have facilities for fumigation, can by the exercise of a little care and common sense and by the use of the simple measures given above, do much to remove the risk of importing diseases and their co-operation in this matter is solicited in the interests of the public generally. There has been a great increase in plant importation during the past few years, and year by year the danger grows greater. Some importations have been actually seen to bring pests, which would have been liberated if not noticed, and as many of these pests are likely to escape notice it is best to treat every importation of living plants or parts of plants which are to be used for planting. Importations solely for food, such as apples, potatoes, etc., are less likely to be dangerous since the insects would not be placed in conditions suitable to propagation but every plant or seed imported and put into the ground is a danger unless properly treated and disinfected.

Mixture A.—Boil 1½ lb. sliced hard soap (bar soap) in one gallon of water till it is dissolved. When boiling, take off the fire, throw in two gallons of kerosine and agitate it till the oil and soap solution form a cremy fluid, with no free oil. The simplest way to agitate it is to pump part violently into the main quantity with a syringe, but continued heating and whisking will have the same effect but take longer. Mix one part of this with seven of water before use.

Mixture B.—Boil 1½ lb. of rosin ¾ lb. washing soda in a small quantity of water in a kerosine tin till dissolved. Continue boiling and add cold water *very slowly* till the tin is half full of liquid. It will froth up and become extremely thick; after some time if kept boiling steadily it will become thin and clear; boil for a few minutes longer and mix with four gallons (one kerosine tin) full of water before use.

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AN OUTBREAK OF A FATAL DISEASE AMONG WILD ELEPHANTS, CATTLE, ETC.

The disease appeared at first among wild elephants in Kakankote forests in June and July 1904. It later on spread among the tamed elephants, cattle that went to Kakankote jungle to drag timber and thence gradually spread towards Antarasante, Heggaddevankote, Hampapur, Hunsur, Tarikere and some other places beyond Mysore borders, where a number of cattle died. Experienced stock owners say that they had not seen this disease either among wild animals or domesticated cattle.

Causes and nature of the disease.—This disease is produced by specific bacteria which gain entrance into the animal body mostly from wounds in various parts of the body especially in the lower extremities. This disease is classed as a variety of septicæmia.

Symptoms.—The infected animal becomes dull, separates from the herd, shivers, has high fever, staring coat, head and face become swollen, ears droop, tongue becomes swollen and coated with a sticky mucus, acrid discharge from nostrils and eyes. Reimination stopped, bowels costive and often coated with blood and mucus swellings appear. The groin, neck and sometimes at the plank and shoulders, death supervenes from 4 to 6 hours or 2 to 3 days in some cases.

Differential Diagnoses.—From the swellings this disease was mistaken by Laymen for human bubonic plague. It has up to date infected only the Herbivosa while the carnivosa remained immune. Some of the symptoms in this disease are common to Rinderpest (cattle plague) and anthrax but in cattle plague animals suffer from 1 to 2 weeks, loins become weak and the animal has a staggering gait, first bowels costive and later on bloody diarrhœ sets in, whereas there is no diarrhœ in this disease but on the other hand the dung is in hard pellets. In various forms of anthrax swellings appear on the throat and quarters but they are not so profuse and extensive, but in this disease the swellings first appear at the groin and extends in a few hours as far as the naval. In anthrax swellings do not generally appear at the flanks and when they are pressed make a crackling sound as if a tissue paper is rubbed, they are full of fine gasious matter, but in this disease there is no such change. In anthrax swellings at throat remain till the animal dies but in this disease they disappear in most cases.